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09/768,271

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Tsukasa Yajima

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EXAMINER

MAI, ANH D

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 06/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/768,271

Applicant(s)

YAJIMA, TSUKASA

Examiner

Anh D. Mai

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 6,7,9,11-13 and 15-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 6,7,9,11-13 and 15-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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## **DETAILED ACTION**

### ***Status of the Claims***

1. Amendment filed April 21, 2006 has been entered. Claim 8 has been cancelled. Claims 6, 11 and 16 have been amended. Claims 6, 7, 9, 11-13 and 15-19 are pending.

### ***Information Disclosure Statement***

2. There are two identical IDS submitted on January 25, 2001 and May 22, 2002, respectively. The IDS submitted May 22, 2002 had been considered and made of record, while the January 25, 2001 submission was scanned in later. Since a reference is only considered once, therefore the duplicate can not be reconsidered and made of record, thus, lined out. The references which were lined out in the Office Action mailed December 21, 2005 are consistent with the MPEP.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 6, 7, 9, 11-13 and 15-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

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There does not appear to be a written description of the claim limitation “a protective layer formed directly on said field oxide to prevent overetching of said field oxide, said protective layer being a conductive layer, having side surfaces thereof over said field oxide and having substantially uniform thickness” (as recited in amended claims 1, 11 and 16) in the application as filed.

Note that, the “protective” layer 12, is formed by planarizing (CMP) the polysilicon layer 11 which is formed on the field oxide 34, Fig. 1d-1e. There is no evidence from the specification that layer 12 has uniform thickness or substantially uniform thickness, since there are too many variable, the surface of the field oxide 34, changing the profile of oxidation masking layer 33, the etch that removes layer 32 and 33, etc.,. Also, the specification is completely silence with respect to the uniform thickness of layer 12.

Applicant must provide support for or cancel the new matter.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 6, 7, 9, 11-13 and 15-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoo et al. (U.S. Patent No. 5,605,853) of record.

With respect to claim 6, Yoo teaches a semiconductor device as claimed including:

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first (16) and second (16) gates formed on an active regions of a substrate (10), the first and second gates (16) each consisting of a refractory metal layer (28) on a polysilicon layer (16) and each having side surfaces;

a field oxide (12) formed on the substrate (10) between the first and second gate (16);

protective layer (21) formed directly on the field oxide (12) to prevent overetching of the field oxide, the protective layer (21) being a conductive layer, having side surfaces thereof over the field oxide, and having substantially uniform thickness;

sidewall spacers (20) of silicon oxide film formed on the side surfaces of the first and second (16) gates; and

an insulating layer (38), a contact hole, and a connecting wire (40) formed above the surface of the substrate (10). (See Fig. 7).

Since the protective layer (21) of Yoo is formed directly on the field oxide, thus the protective layer (21) is fully capable of preventing overetching of the field oxide (12).

With respect to claim 11, Yoo teaches a semiconductor device as claimed including:

a gate (16) formed on an active region of a substrate (10), gate (16) having side surfaces;

a field oxide (12) formed on the substrate (10) adjacent the active region;

a protective layer (21) formed directly on the field oxide (12) to prevent overetching of the field oxide, the protective layer (21) being a conductive layer, having side surfaces thereof over the field oxide, and having substantially uniform thickness;

sidewall spacers (20) formed on the side surfaces of gate (16); and

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an insulating layer (38), a contact hole, and a connecting wire (40) formed above the surface of the substrate (1),

the protective layer (21) being formed on the field oxide only. (See Fig. 7).

Since the protective layer (21) of Yoo is formed directly on the field oxide, thus the protective layer (21) is fully capable of preventing overetching of the field oxide (12).

With respect to claim 16, as best understood by the examiner, Yoo teaches a semiconductor device as claimed including:

a gate (16) formed on an active region of a substrate (10), the gate (16) consisting of a refractory metal layer (24) on a polysilicon layer and having side surfaces;

a field oxide (12) formed on the substrate (10) adjacent the active region;

a protective layer (21) formed directly on the field oxide (12) to prevent overetching of the field oxide, the protective layer (21) being a conductive layer and having side surfaces thereof over the field oxide (12), and having substantially uniform thickness;

sidewall spacers (20) of silicon oxide film formed on the side surfaces of the gate (16);

and

an insulating layer (38), a contact hole, and a connecting wire (40) formed above the surface of the substrate (1),

the protective layer (21) being formed on the field oxide (12) only. (See Fig. 7).

Since the protective layer (21) of Yoo is formed directly on the field oxide, thus the protective layer (21) is fully capable of preventing overetching of the field oxide (12).

With respect to claims 7, 12 and 17 the protective layer (21) of Yoo is a polysilicon layer.

With respect to claims 9, 13 and 18, the first and second gates (16) of Yoo are a MOSFET gates.

With respect to claims 15 and 19, the semiconductor device of Yoo further comprising an additional gate (16) formed on the substrate (10), the field oxide (12) being formed on the substrate (10) between the gate (16) and the additional gate (16).

### *Response to Arguments*

5. Applicant's arguments filed November 09, 2005 have been fully considered but they are not persuasive.

Regarding the uniform thickness of the protective layer, Applicant asserts: "accordingly, polysilicon 12 after CMP processing would inherently have substantially uniform thickness".

The Applicant's assertion seem to base on the drawing but does not seem to base on any fundamental technical of the semiconductor technology.

To start, the field oxide 34 layer have never have "flat" surface as shown in Fig. 1c, the actual surface contour of the field oxide is arch like or rounded top. Upon the CMP, at best, the top surface of the polysilicon 11 is flat but the bottom is rounded, thus, the layer 12 could not and never would have been uniform thickness.

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With respect to the layer 21 of Yoo being the protective layer, the functionality of the layer 21 of Yoo have been well defined as the protective layer by the Board of Patent Appeals and Interferences dated February 15, 2005.

Regarding the uniform thickness of layer 21 of Yoo, unlike layer 11 of the instant application, layer 21 is conformally deposited, hence uniform thickness. The process step that defines layer 21 is photoresist, which does not interfere with the thickness of the underlayer. Therefore, layer 21 starts as a uniform thickness, should inherently end as a uniform thickness as well.

### ***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.



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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh D. Mai whose telephone number is (571) 272-1710. The examiner can normally be reached on 8:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
**ANH D. MAI**  
**PRIMARY EXAMINER**